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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
ZERVIGON, RUDY	
ART UNIT	**PAPER NUMBER**
1763	

DATE MAILED: 04/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/895,511	LIANG ET AL.	
	Examiner	Art Unit	
	Rudy Zervigon	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 March 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4-12 and 18-33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4-12 and 18-33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

`DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 9, 2006 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 28 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 28 requires "controls that are more sophisticated than in an SEM". Applicant's level of sophistication is uncertain.

Claim Rejections - 35 USC § 103

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 1, 4-12, 18, 20, 25, and 27-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Casey, Jr. et al (USPat. 6,042,738) as demonstrated by Baum, Aaron Wolf et al (US 5,684,360 A) in view of Parker; Norman W. et al. (US 4,818,872 A).

Casey teaches an apparatus (Figure 1) including:

i. A holder (26) to mount a substrate / mask (30) in a chamber (22) by a stage (24) – Regarding the particular identity of the article to be processed, it is well established that apparatus claims must be structurally distinguished from the prior art (In re Danley, 120 USPQ 528, 531 (CCPA 1959). "Apparatus claims cover what a device is, not what a device does ."(emphasis in original) Hewlett - Packard Co . v. Bausch & Lomb Inc ., 15 USPQ2d 1525, 1528 (Fed. Cir. 1990), MPEP – 2114). Further, a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Exparte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

ii. A stage (24) adapted to position the holder in a chamber (22), and adapted to move in different directions (column 4, line 64 – column 5, line 3)

iii. A pumping system ("vacuum chamber 22"; column 4, lines 31) adapted to evacuate the chamber

iv. A first electron column[1] imaging system (28, 54; column 4, lines 38-45; column 5, lines 5-10; Figure 1; column 3, lines 8-16, "image and mill the workpiece"; column 4, lines 5-10; column 5, lines 5-10) adapted to locate (column 6, lines 17-30) an opaque defect (abstract; column 1, lines 5-10; column 2, lines 28-50; column 8, line 62 – column 9, line 2;) in the substrate / mask, said imaging system (28; Figure 1; column 3, lines 8-16, "image and mill the workpiece"; column 4, lines 5-10; column 5, lines 5-10) disposed vertically above (28) said substrate (90; Figure 1)

v. A gas delivery system (45, 34; column 5, lines 22-38) adapted to dispense a reactant gas towards the defect

vi. A second electron column[1] delivery system (32, 54, 56, 62, 64, 52/112; column 4, line 64 – column 5, line 12; column 5, line 63 - column 6, line 10) adapted to direct electrons towards the opaque defect (column 3, lines 60-65) to induce chemical etching by the reactant gas and said electrons to induce said gas to etch said opaque defect without ion "bombardment, and without ion implantation or knock-on of atoms" – "methods of gas-assisted etching using an etching gas including bromine" (abstract). It is noted that when the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01).

vii. DUV/EUV mask / substrate (column 1, lines 35-45)

viii. Chrome opaque defect (column 3, lines 3-4; line 55)

ix. An ion focusing control system (18; column 4, lines 28-44) and scanning control system (62, column 4, lines 39-43)

x. An acceleration system ("JEOL Model 6400") providing a low acceleration voltage (column 9, lines 20-25)

xi. A computer controller (50, 52/112, column 4, lines 38-45; column 7, lines 33-44; column 5, line 63 - column 6, line 10; column 7, lines 32-44) adapted to control the second electron column[1] delivery system (32, 54, 56, 62, 64, 52/112; column 4, line 64 – column 5, line 12; column 5, line 63 - column 6, line 10) – claim 10, 12.

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[1] Baum, Aaron Wolf et al (US 5,684,360 A) teaches the art-accepted definition of "electron beam column" (column

xii. The gas delivery system (34; column 5, lines 22-38) is also adapted to "dispense a carrier gas towards said opaque defect", "said gas comprises water or oxygen" (claim 29), "said gas comprises Xenon Fluoride (XeF2)" (claim 30) – Applicant's claim 18, 29, 30 limitations are intended use claim requirements. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey,152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

xiii. Applicant's claim 20 limitation of "the reactant gas absorbs to said opaque defect and becomes disassociated" are intended use claim requirements. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey,152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

6, lines 30-35)

Casey does not teach that Casey's first electron column (28; Figure 1; column 3, lines 8-16, "image and mill the workpiece"; column 4, lines 5-10; column 5, lines 5-10) is used to direct a first set of electrons towards a substrate.

Casey does not teach that Casey's second electron column[1] delivery system (32, 54, 56, 62, 64, 52/112; column 4, line 64 – column 5, line 12; column 5, line 63 - column 6, line 10) is capable of "scanning".

Casey does not teach Casey's computer controller (50, 52/112, column 4, lines 38-45; column 7, lines 33-44; column 5, line 63 - column 6, line 10; column 7, lines 32-44) adapted to control the second electron column[1] delivery system (32, 54, 56, 62, 64, 52/112; column 4, line 64 – column 5, line 12; column 5, line 63 - column 6, line 10) can control Casey's second electron column[1] delivery system (32, 54, 56, 62, 64, 52/112; column 4, line 64 – column 5, line 12; column 5, line 63 - column 6, line 10) "dwell time", "scan rate", "refresh time", and "retrace time" because Casey does not teach that Casey's second electron column[1] delivery system (32, 54, 56, 62, 64, 52/112; column 4, line 64 – column 5, line 12; column 5, line 63 - column 6, line 10) is capable of "scanning". However, Casey's computer controller (50, 52/112, column 4, lines 38-45; column 7, lines 33-44; column 5, line 63 - column 6, line 10; column 7, lines 32-44) is inherently capable of controlling "dwell time", "scan rate", "refresh time", and "retrace time" as evidenced from Casey's "scan generator element 62", "dwell registers 64" (column 4, line 40; column 7, line 55 – column 8, line 5), and processor 52/112 "to implement a digital raster pattern" (column 5, line 65). Applicant's claimed "times" and "rates" of moving are translated to Casey's control element 58 to generate raster motions which have "dwell time", "scan rate", "refresh time", and

"retrace time" based on the desired milling instructions (column 6, lines 1-10; column 7, lines 45-54).

Parker teaches a scanning ("ion beam is scanned"; claim 1,) electron column (4; Figure 1A; column 4; lines 13-23) used to direct a first set of electrons (10; Figure 1A; column 4; lines 13-23) towards a substrate ("targets"; column 2, lines) for charge neutralization (claim 1, "second, charge neutralization mode"). Parker further teaches

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Parker's electron column to Casey's apparatus and to optimize the operation of Casey's apparatus to avoid damaging underlying layers of the processed substrate.

Motivation to add Parker's electron column to Casey's apparatus and to optimize the operation of Casey's apparatus to avoid damaging underlying layers of the processed substrate is to minimize substrate damage as taught by Casey (column 9; lines 65-67) and for combining multiple beam sources into one apparatus as taught by Parker (column 3; lines 29-31) to image "with high spatial resolution" as taught by Parker (column 3; lines 33-35). Further, it is well established that the duplication of parts is obvious (In re Harza , 274 F.2d 669, 124 USPQ 378 (CCPA 1960) MPEP 2144.04). It would be obvious to those of ordinary skill in the art to optimize the operation of the claimed invention (In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980); In re Hoeschele , 406 F.2d 1403, 160 USPQ 809 (CCPA 1969); Merck & Co. Inc . v. Biocraft Laboratories Inc. , 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied , 493 U.S. 975 (1989); In re Kulling , 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990), MPEP 2144.05).

6. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Casey, Jr. et al (USPat. 6,042,738) as demonstrated by Baum, Aaron Wolf et al (US 5,684,360 A) in view of Parker; Norman W. et al. (US 4,818,872 A) and Fuji, Eiji et al (US 5,876,504 A). Casey and Parker are discussed above. Casey and Parker are do not teach the angle of gas injection of Casey's gas delivery system (45, 34; column 5, lines 22-38) has an angular dispersion of 5-25°. Fuji teaches a variably positioned gas injection nozzle (8; Figure 2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace Casey and Parker's gas injector nozzle with Fuji's variably positioned gas injection nozzle (8; Figure 2).

Motivation to replace Casey and Parker's gas injector nozzle with Fuji's variably positioned gas injection nozzle (8; Figure 2) is for establishing laminar flow on the substrate as taught by Fuji (column 4, lines 35-40).

7. Claims 21-24, 26, 32, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Casey, Jr. et al (USPat. 6,042,738) as demonstrated by Baum, Aaron Wolf et al (US 5,684,360 A) in view of Parker; Norman W. et al. (US 4,818,872 A). Casey and Parker are discussed above. Casey does not teach operating pressures in 0.5-10.0mTorr, "a beam comprising a current of about 0.05-1.0nA", second electrons beams with diameters of about 5-125nm and energies of 0.-3.0keV. Casey further does not teach that his reactor is either reaction-limited or mass transfer limited as claimed by Applicant's claim 33 – However, when the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01).

Parker further teaches an electron beam apparatus (Figure 7) including operating pressures up to 100picoTorr (column 6, lines 15-20), beam currents of about 1.0nA (column 7, lines 1-10), electrons beams with diameters of about 5-125nm ("not more than 1 micrometer"; column 7, lines 1-10) and energies of 3.0keV (column 7, lines 23-31).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace Casey's electron emitting column with Parker's electron emitting column (12; Figure 7).

Motivation to replace Casey's electron emitting column with Parker's electron emitting column (12; Figure 7) is for thin film processing as taught by Parker (column 6, lines 30-41).

Response to Arguments

8. Applicant's arguments with respect to claims 1, 4-12, and 18-33 have been considered but are moot in view of the new grounds of rejection.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272-1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1763 art unit is (571) 273-8300. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Parviz Hassanzadeh, at (571) 272-1435.

4/20/06